

SHARP®

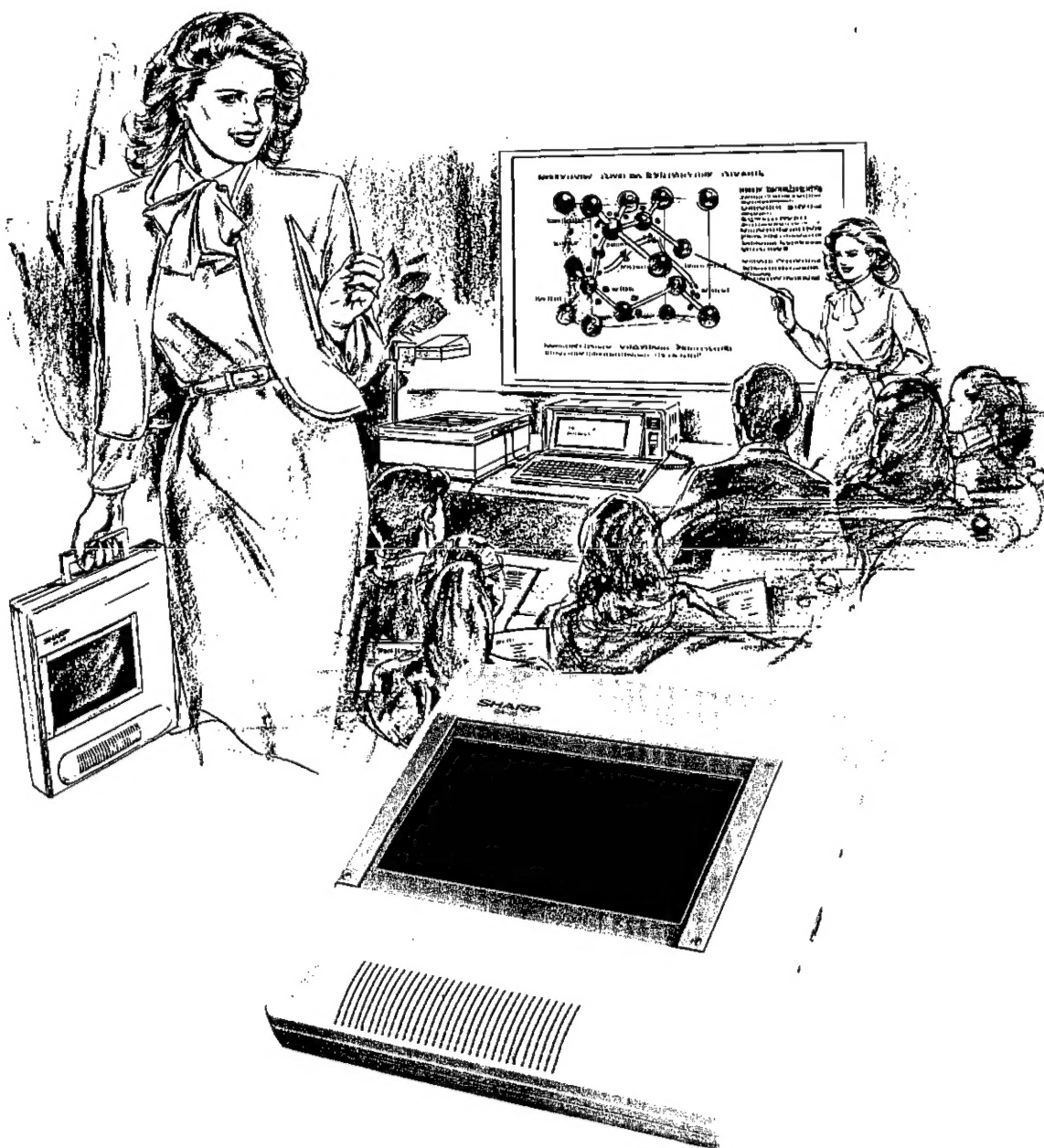
COMPUTER PROJECTION PANEL
COMPUTER DATENPROJEKTOR
PANNEAU DE PROJECTION
PANNELLO DI PROIEZIONE COMPUTERIZZATO

MODEL
MODELL
MODELE
MODELLO

QA-25

OPERATION MANUAL
BEDIENUNGSANLEITUNG

MANUEL D'INSTRUCTIONS
MANUALE DI ISTRUZIONI



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SPECIAL NOTES

Thank you for purchasing this SHARP Product. We hope it will give you many years of trouble-free enjoyment. But for the best performance, read this Manual carefully. It will guide you in operating your SHARP product.

- The Sharp Computer Projection Panel incorporates the latest development in Super Twisted High Contrast Liquid Crystal Display technology. While this LCD is capable of producing images that, when projected, are amazingly bright and high in contrast, please note that all liquid crystal displays also have very strict maximum temperature limitations. As such, this Panel should not be used with any overhead projector (or in any environment) which might cause operation temperature of the LCD to exceed 45°C
- The images produced by this Panel, when displayed, are dark blue in color, with light gray background. For convenience in this manual, these images are sometimes referred to as "black and white", when in fact, they are "blue and gray".
- This unit should only be used with high quality **transmissive** type overhead projectors. It is not designed to be used with compact reflective mirror type overhead projectors.

FOR YOUR RECORDS

For your assistance in reporting this unit in case of loss or theft, please record below the model number and serial number which are located on the bottom of the unit. Please retain this information.

Model number QA-25

Serial number _____

Date of purchase _____

Place of purchase _____

1. INTRODUCTION

The Sharp QA-25 Computer Projection Panel is an entirely new type of display medium for the presentation of on-screen computer data via overhead projector. With conventional overhead projectors, transparency cels representing various texts and graphics are created and then manually positioned on a transmissive overhead projector for presentation. With Sharp's new process, the Computer Projection Panel incorporates a monochrome transmissive liquid crystal display (LCD) and is placed directly on an overhead projector glass platen. The Panel is connected to the separate RGB (Red/Green/Blue) video signals from a personal computer that is equipped with an IBM-PC CGA (Color Graphics Adaptor) or other appropriate RGB adaptor. This system allows projection of the personal computer's display via overhead projector without requiring any software modifications.

The Computer Projection Panel, when used with a standard transmissive overhead projector, serves to enlarge text, graphics and animation graphics onto a large screen or wall. It makes a wide range of presentations – from education to business – much more appealing and effective.

NOTES

1. The Computer Projection Panel cannot be used with a compact reflective mirror type overhead projector.
2. The Computer Projection Panel has been designed to be compatible with IBM PC/XT/AT computers and 100% compatibles when the computer is equipped with a Color Graphics Adaptor or Enhanced Graphics Adaptor (in CGA mode only). This Panel also is compatible with other personal computers, such as Apple IIe, when the computer is equipped with RGB adaptor whose output conforms with Sharp's published specifications (see specifications on pages 24-28).

2. UNPACKING

Unpack and check that all of the components are in the carton.
Please retain the Operation Manual for future reference.

Included components are:

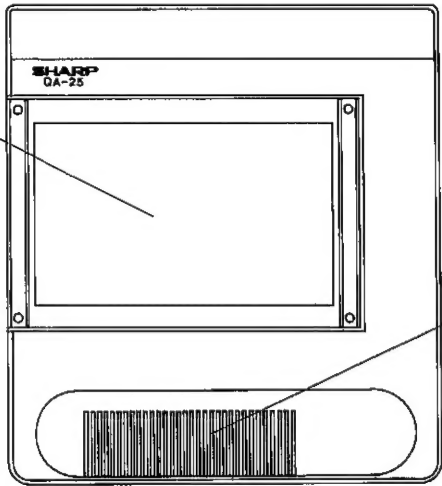
- (1) Panel
- (2) RGB Signal Cable
- (3) AC Adaptor (ADP-0031)
- (4) Operation Manual

3. DESCRIPTION OF MAIN COMPONENTS

(a) PANEL

Monochrome transmissive
LCD (640×200 dots)
with reinforced safety
glass on both sides

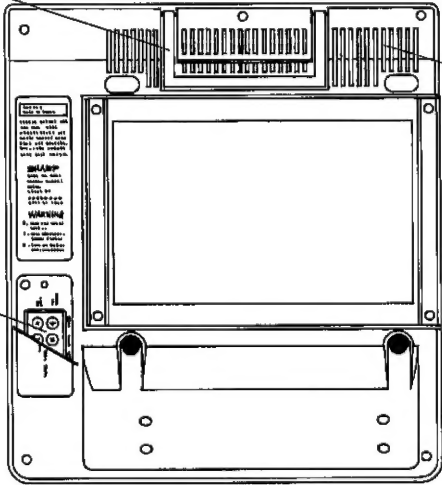
Top view



Cooling fan
(air intake vent)

Fold-down type
carrying handle

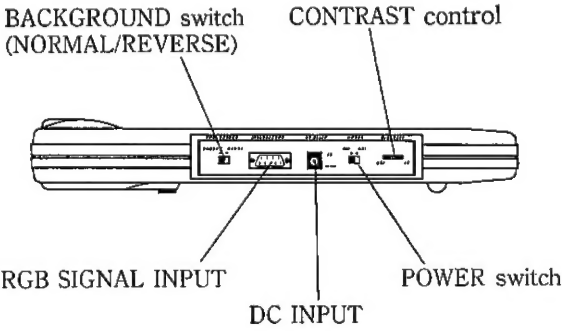
Bottom view



Air outflow vent

Adjustment controls
(covered by protective door)
* Refer to chapter 5 for
adjustment instructions
(pages 12-19)

Side view



BACKGROUND switch
(NORMAL/REVERSE)

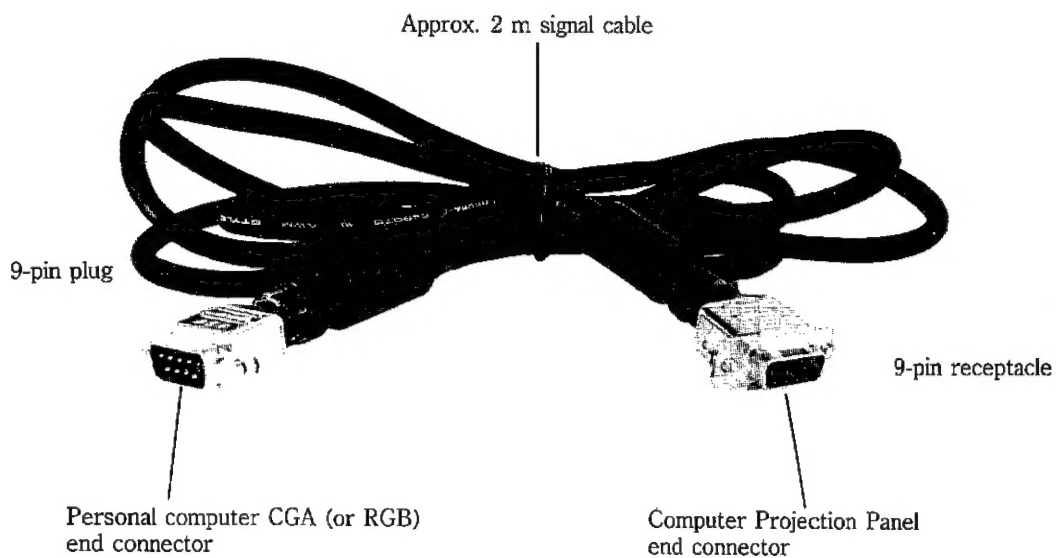
CONTRAST control

RGB SIGNAL INPUT

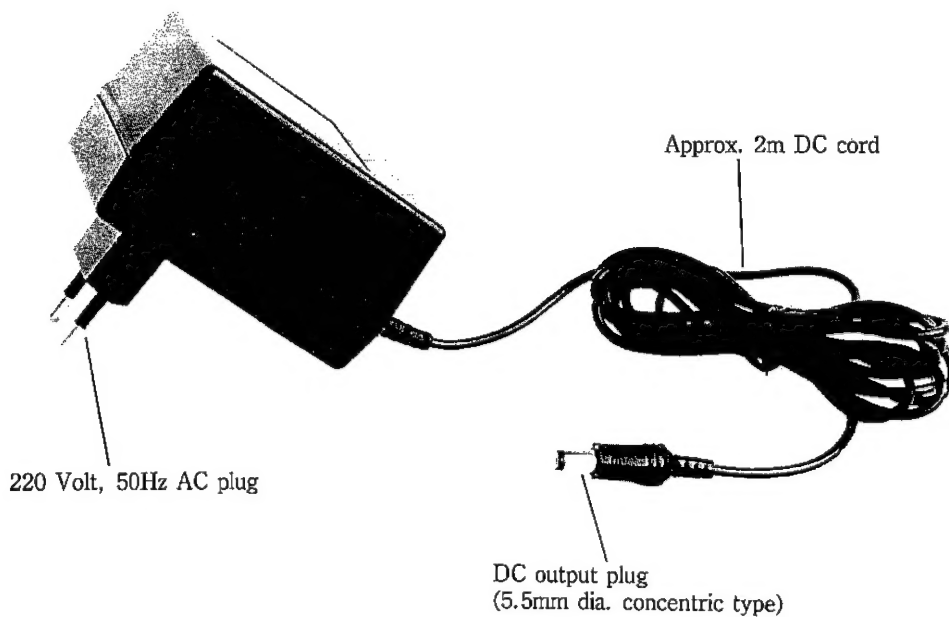
DC INPUT

POWER switch

(b) RGB SIGNAL CABLE



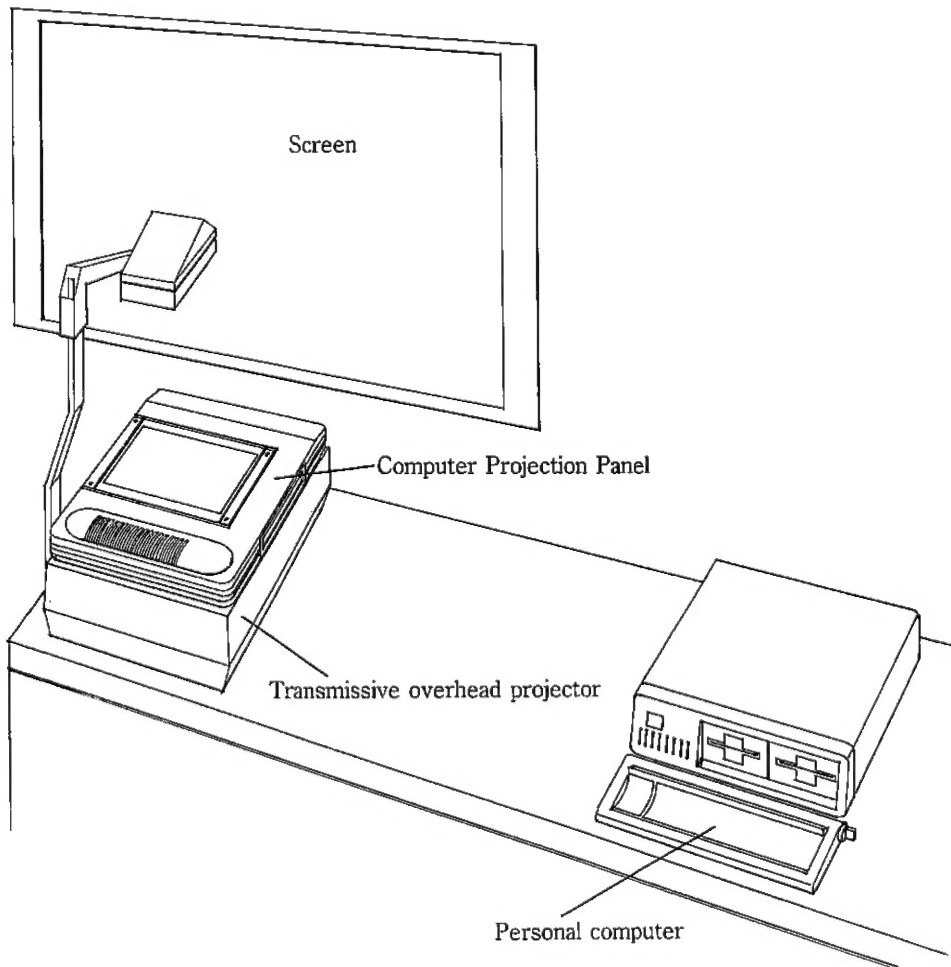
(c) AC ADAPTOR (ADP-0031)



4. DIRECTIONS FOR USE

(a) POSITIONING

- 1) Set your overhead projector in the best position for projection.
- 2) Place your personal computer in a convenient position next to the overhead projector.
The approximately 2 m long DC cord of the AC Adaptor and RGB Signal Cable allow flexible positioning to fit a variety of projection environments.
- 3) Place the Computer Projection Panel on the overhead projector's glass platen.
The Panel should be placed on the overhead projector so that the end of the Panel with the fold-down carrying handle is closest to the projection screen, and the end of the Panel with the air intake vent on top is farthest away (see illustration below).
Align the center of the glass platen with the center of the Panel's LCD.



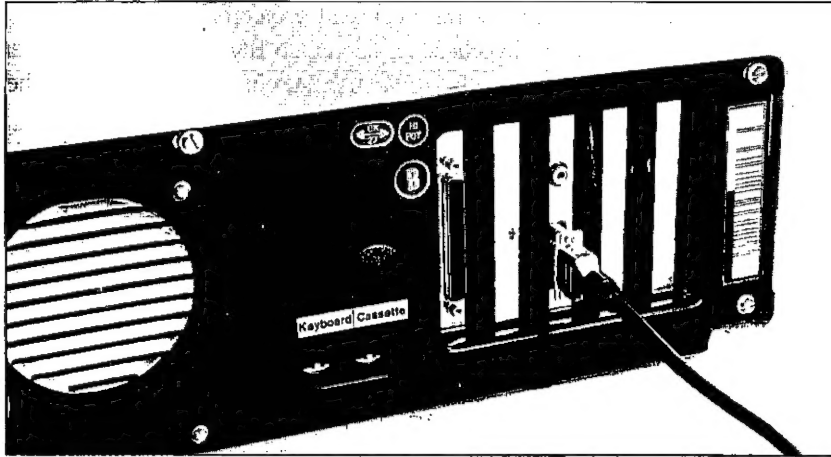
(b) CONNECTION

Before performing any electrical connections, please make sure both the overhead projector and personal computer are turned off.

1) RGB Signal Cable Connection

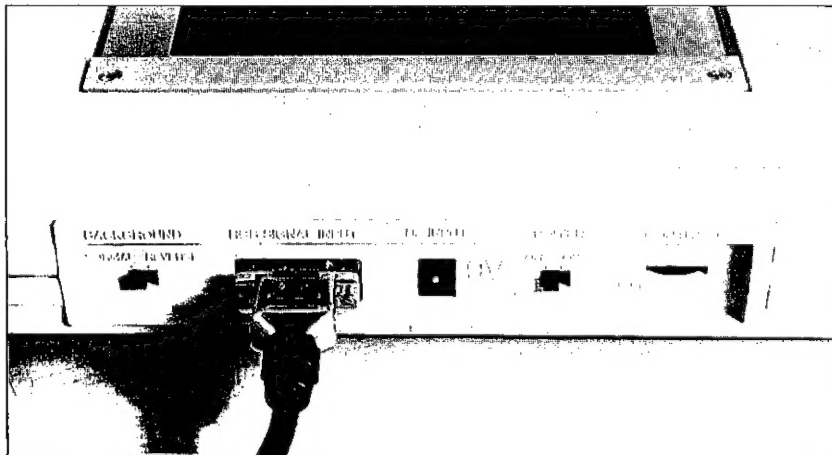
Insert the personal computer end connector of the RGB Signal Cable into the computer's CGA (or RGB) output socket.

Securely fasten the connector to the socket with a screwdriver (see below).



Insert the Computer Projection Panel end connector of the RGB Signal Cable into the RGB SIGNAL INPUT socket on the side of the Computer Projection Panel.

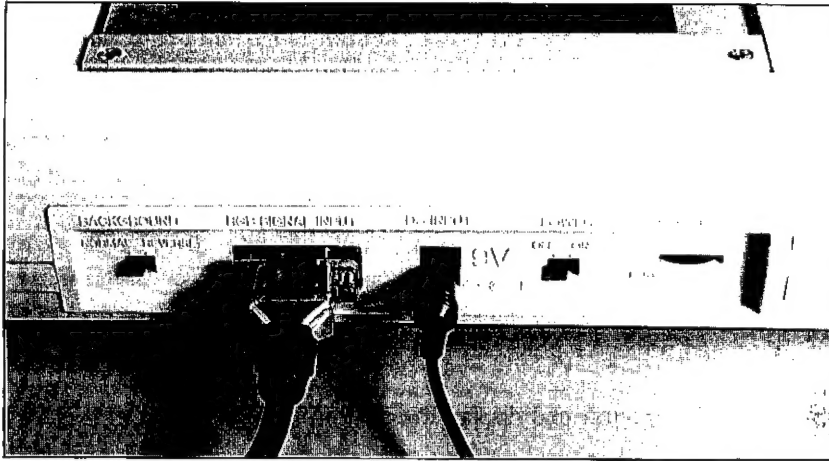
Securely fasten the connector to the socket with a screwdriver (see below).



2) Power Supply Connection

Insert the DC output plug of the AC Adaptor into the DC INPUT socket on the side of the Computer Projection Panel (see below).

Make sure that the Panel's power is off, and then insert the AC plug of the AC Adaptor into a 220V outlet.



CAUTION

Do not use any other type of the ADP-0031 AC Adaptor to supply power to the Panel.
Do not use any other type of the accessory RGB Signal Cable for connection between the Panel and the computer.

(c) OPERATION STEPS

When you have connected the Computer Projection Panel to the personal computer, go on to Adjustment and Operation according to the following procedures.

1) Turn the Computer Projection Panel on.

- Caution:**
- **Do not turn the overhead projector power switch on when the Panel power switch is off.**
 - **The built-in cooling fan in the Panel body operates when the Panel's power switch is on.**
This fan prevents temperature increases in the Panel.
If the overhead projector power switch is turned on, with the Panel power switch off, heat generated by the overhead projector may cause damage to the Panel.
 - **If the cooling fan should stop – for any reason – turn the overhead projector power off immediately, or remove the Panel from the overhead projector's glass platen.**
 - **Do not block the air flow vent, nor operate the Panel on an overhead projector in an "upside down" position (bottom of unit facing up).**

2) Turn on the overhead projector power switch and begin projection.

3) Turn on the personal computer and display the desired image.

4) Adjust the overhead projector to bring the projected images into focus and adjust the Panel's CONTRAST control for the best images.

NOTES

1. To achieve the best contrast position, turn the CONTRAST control to the point just **before** where the picture background starts to lose uniformity, and lines start to appear on the screen.
2. After the overhead projector has been in use for a while, heat from the projector may cause the Panel's contrast to change slightly. If this should occur, simply re-adjust the contrast, using the method noted immediately above.

- 5) The BACKGROUND switch gives you the option of reversing (inverting) the screen's (white level/black level) background color. When this switch is in "REVERSE" position, anything normally appearing "white" would be displayed "black", and anything normally appearing "black" would be displayed "white". Select the appropriate background for your images to be displayed.
- 6) When the image is not centered on the LCD, or characters and graphics flicker, signal control adjustment may be required.
See adjustment procedures on pages 13-16.
- 7) Once the projection adjustments have been made, continue with the same operations as new data and text are displayed on the CRT screen.
When using personal computer programs which incorporate color text or graphics, remember that this Panel's LCD only displays "monochrome" colors*.
* dark blue images, with light gray background.
- 8) If certain "colors" are not being displayed by the monochrome Panel, adjustment of the Panel's individual RGB INPUT SELECT switches may be needed. Information on this important adjustment procedure is described on pages 17-19.

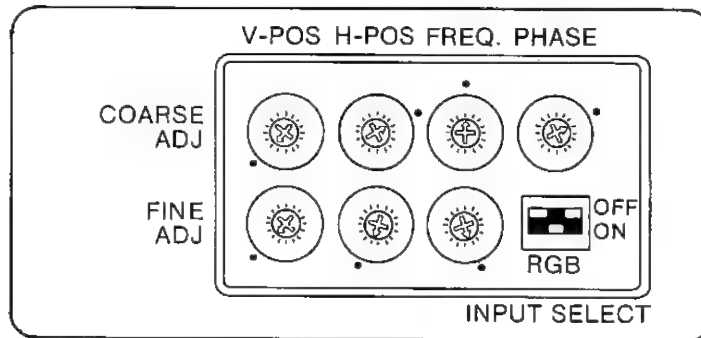
5. PROJECTION IMAGE ADJUSTMENTS

(Located in computer interface adjustment compartment)

(a) EXPLANATION OF ADJUSTMENT CONTROLS

The following instructions explain how to adjust the position of the image, correct image flickering, and make RGB signal selections.

These adjustments are made with the seven rotary DIP-switches and three On/Off switches located on the bottom of the Panel, beneath the protective door.



- **V-POS – COARSE and FINE ADJ**

Vertical adjustment: These two controls center the image's vertical position. The upper rotary DIP-switch is for coarse adjustment; the lower rotary DIP-switch is for fine adjustment.

- **H-POS – COARSE and FINE ADJ**

Horizontal adjustment: These two controls center the image's horizontal position. The upper rotary DIP-switch is for coarse adjustment; the lower rotary DIP-switch is for fine adjustment.

- **FREQ – COARSE and FINE ADJ**

Frequency adjustment: These two controls adjust the internal clock frequency of the display Panel to match the clock frequency of your personal computer. Given values vary depending on the computer model. The upper rotary DIP-switch is for coarse adjustment; the lower rotary DIP-switch is for fine adjustment.

- **PHASE**

Phase adjustment: This control corrects the phase difference between the display clock frequency and the RGB video signal. This eliminates screen flickering.

- **RGB INPUT SELECT**

RGB signal selection: These three switches allow you to select which input colors (Red/Green/Blue) will appear as "white" (light gray) or "black" (dark blue). You can select any of seven RGB setting combinations to optimize the Panel's monochrome display for use with your color software program.

NOTES

1. These controls are all factory preset for use with most versions of the IBM-PC. Prior to initial use, readjustment of these controls may be required, depending on the specific computer and software package being used. Further slight readjustment of these controls may also be necessary, when going from one computer to another, from one mode to another, or from one software package to another.
2. A protective door prevents accidental misadjustment of these controls by non-technical users.
3. In the case of misadjustment of these controls, to return the Panel to original factory settings, adjust each control until it is lined up with the factory alignment mark, located next to the control.

(b) ADJUSTMENT PROCEDURE

To correct the position of an image on the display, or to eliminate any "flickering" in the picture, place the Computer Projection Panel upside down on a desk or table that has been covered with white paper, and perform the following adjustments, while characters or graphics are being fully displayed on the LCD.

NOTES

1. Do not perform these adjustments on top of an overhead projector while the lamp in the overhead projector is turned on.
2. Before performing these adjustments, it is necessary to remove the protective door covering the adjustment controls. (After performing these adjustments, don't forget to put the protective door back on the Panel.)

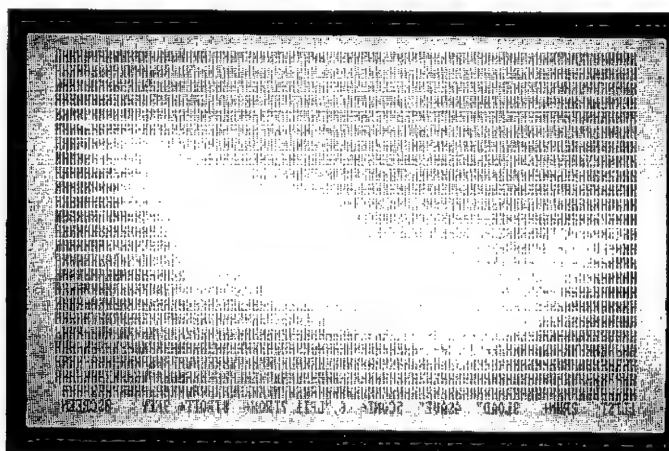
Sample BASIC program for adjustment procedure

```
10 FOR N=0 TO 1998
20 PRINT "H";
30 NEXT N
40 GOTO 40

run
```

(Characters "H" will be fully displayed on the LCD.)

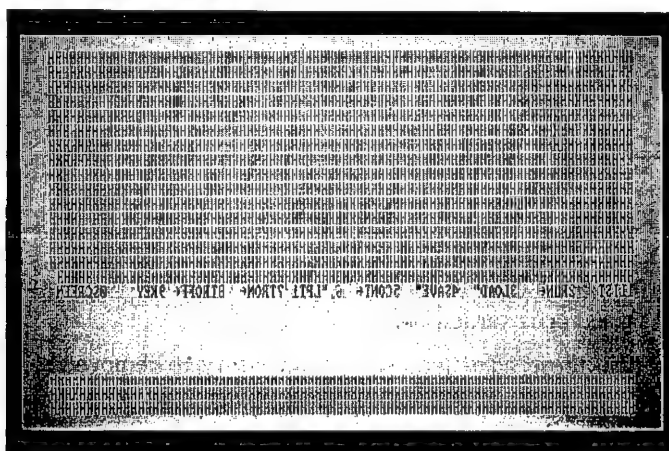
Display where no adjustment is needed



1) Vertical Adjustment

While looking at the LCD, use the upper rotary V-POS DIP-switch to make a coarse adjustment, bringing the display's vertical position near to the center of the LCD. Then, use the lower V-POS adjustment DIP-switch to make fine centering adjustments.

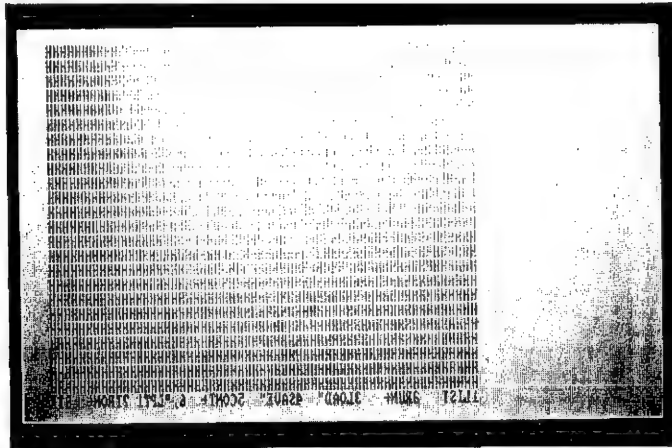
Vertical adjustment needed



2) Horizontal Adjustment

While looking at the LCD, use the upper rotary H-POS DIP-switch to make a coarse adjustment, bringing the display's horizontal position near to the center of the LCD. Then, use the lower H-POS adjustment DIP-switch to make fine centering adjustments.

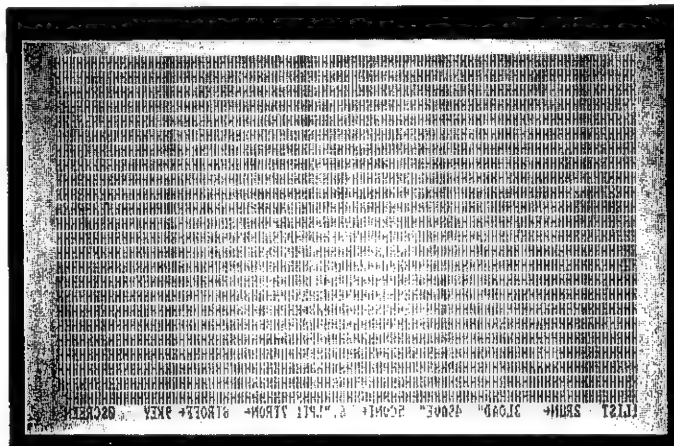
Horizontal adjustment needed



3) Frequency Adjustment

The two FREQ rotary DIP-switches adjust the Panel's frequency to match that of your computer. If the images on the display appear to be too compressed or too spread out, or if the picture appears to be badly broken up, adjust the coarse and fine FREQ adjustment controls until the best image quality and image size is achieved.

Frequency adjustment needed



"Technical" Adjustment of Frequency

The frequency adjustment procedure described on page 15 will achieve very good results. However, for more "technical" users, the following much more detailed adjustment procedure will provide an even more exacting match of the Panel's frequency to that of the computer.

The second digit of the Panel's frequency indicates a hexadecimal expression for COARSE ADJUSTMENT. The first digit represents, in hexadecimal, an equivalent expression for FINE ADJUSTMENT.

Use the following formula to determine the correct frequency ("f") adjustment for the Panel:

$$f = Th/Tck - 1$$

In this formula, "Th" refers to horizontal period and "Tck" to display clock period.

Formula example

In the case of the IBM-PC CGA, $Th = 63.7\mu\text{sec}$, $Tck = 69.84\text{nsec}$ (14.318MHz).

When applied to the above formula:

$$\begin{aligned} f &= 63.7 \times 10^{-6} / (69.84 \times 10^{-9}) - 1 \approx 911 \text{ (decimal)} \\ &= 38F \text{ (hexadecimal)} \end{aligned}$$

Since the third digit of the Panel frequency is preset at "3", and the **FREQ Coarse Adjustment** is made with the second digit, set the Coarse Adjustment (the second digit) at the "8" position, and then set the Fine Adjustment (the first digit) at the "F" position.

4) Phase Adjustment

If the picture appears to be **flickering** or **out of focus**, there may be a phase mismatch between the Panel and your computer. To correct this problem, while looking at the LCD, turn the **PHASE** rotary DIP-switch to the center of the range in which no flickering is seen on the LCD.

For example;

- if there is no flicker between 1 and 7, set the control to 4.
- if there is no flicker between 0 and 5, set the control to 2.
- if there is no flicker between 9 and D, set the control to B.

5) RGB Signal Selection

This display is capable of producing **“monochrome”** colors (dark blue images with a light gray background).

Each of the color values being input into the Panel can either be set to appear as **“white”** (light gray), or **“black”** (dark blue) using the RGB input select switches located on the bottom of the Panel under the protective door. [When the R, G or B input select switch is **“on”**, that color will appear as **“black”**; when the R, G or B input select switch is **“off”**, that color will appear as **“white”**.]

The following is the factory setting for these three (R, G & B) switches:

R (“Red”): OFF
G (“Green”): ON
B (“Blue”): OFF

With these settings, the following colors are displayed as **“black”**: green, brown, cyan and white. With these settings, the following colors are displayed as **“white”**: black, red, blue and magenta.

These factory settings have been found to provide the best picture results with **most** types of software, and, probably, you will never have to re-adjust them. There may be times, however, when you wish to change them.

For example, if a color software program has red images being projected on a blue background, the entire display would appear as **“white”**.

In the event this problem should occur, it may be necessary to change the setting of the **“R”** (red) signal input select switch, so that this color is displayed as **“on”** (black), instead of **“off”** (white).

The following is a list of all of the possible setting combinations for the RGB input select switches, and how each color will appear when projected using the Computer Projection Panel:

Setting Combination #1

R: ON
G: ON
B: ON

- The following colors appear as "black": red, green, blue, brown, cyan, magenta, white
- The following color appears as "white": black

Setting Combination #2

R: ON
G: ON
B: OFF

- The following colors appear as "black": red, green, brown, cyan, magenta, white
- The following colors appear as "white": black, blue

Setting Combination #3

R: OFF
G: ON
B: ON

- The following colors appear as "black": green, blue, brown, cyan, magenta, white
- The following colors appear as "white": black, red

Setting Combination #4

R: ON
G: OFF
B: ON

- The following colors appear as "black": red, blue, brown, cyan, magenta, white
- The following colors appear as "white": black, green

Setting Combination #5

R: ON
G: OFF
B: OFF

- The following colors appear as "black": red, brown, magenta, white
- The following colors appear as "white": black, green, blue, cyan

Setting Combination #6*

R: OFF
G: ON
B: OFF

* Note: This is the original factory setting

- The following colors appear as "black": green, brown, cyan, white
- The following colors appear as "white": black, red, blue, magenta

Setting Combination #7

R: OFF
G: OFF
B: ON

- The following colors appear as "black": blue, cyan, magenta, white
- The following colors appear as "white": black, red, green, brown

NOTE

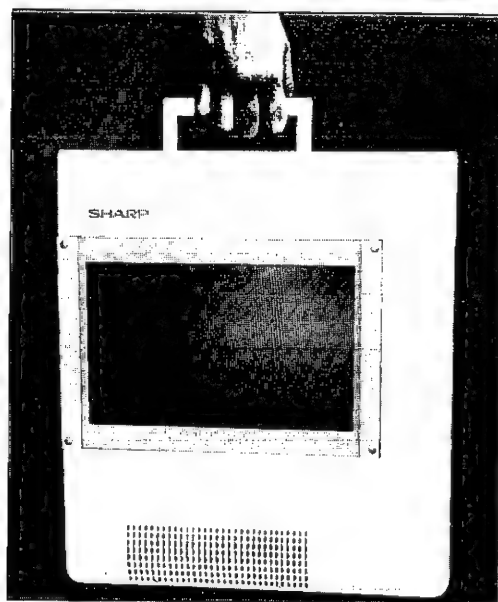
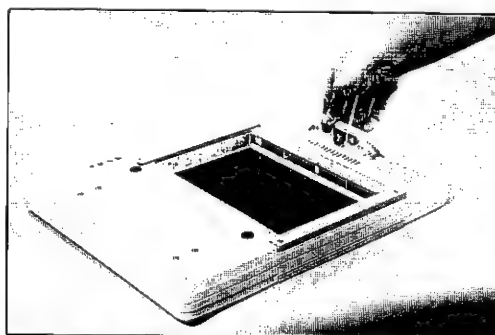
If the BACKGROUND switch on the side of the Panel is in its "Reverse" position, please note that anything normally appearing in "white" would be displayed in "black"; and anything normally appearing in "black" would be displayed in "white".

6. TRANSPORTING THE UNIT

- Use the built-in carrying handle for short-distance carrying.
Simply pull up the fold-down type carrying handle on the back of the body and use it to carry the Panel.

NOTE

Handle the Panel with care; avoid rough handling such as swinging or bumping. The Computer Projection Panel has delicate internal mechanisms, as well as glass components.



- Carry the Panel carefully in a briefcase when transporting it over long distances.

7. MAINTENANCE

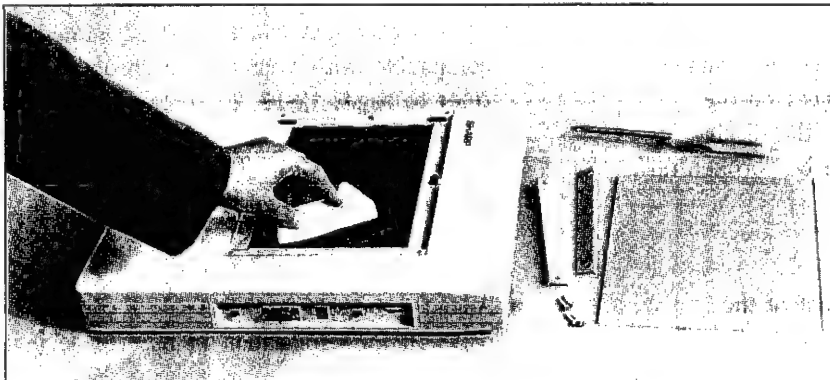
The Computer Projection Panel has been designed to require very little maintenance.

- Check that the Power switch is **OFF** before performing any maintenance to the unit.
1. **Cleaning the top and bottom glass surfaces.** You may clean the glass surfaces of the Panel using a soft cloth moistened with any standard glass cleaner.
 2. **Cleaning the plastic cabinet.** The cabinet may be cleaned using a soft cloth and a diluted soap solution.

NOTE

Do not use a chemically treated cleaning cloth, benzine or paint thinner. This will cause the cabinet material to change chemically and result in cracking, peeling or damage to the finish.

3. If dust should appear on the “inside” of the glass, remove the screws holding the glass in place, and very carefully dust off the inside of the glass.



NOTE

Please be very careful not to spill any liquids into the unit, as this could cause permanent damage.

8. TROUBLESHOOTING

Before calling for service, please closely review the following troubleshooting information.

Problems:

1. No picture appears on the Computer Projection Panel.

2. Picture image is "inverted" (black images appear as white; white images appear as black).

3. Display is off-centered or flickering, certain images do not appear on the display, or the display appears to be "broken up".

4. The contrast of the display is not "uniform".

Possible Solutions:

- Make sure the Panel's AC adaptor is properly connected.
 - Make sure the RGB signal cable is properly connected to both the personal computer and the Panel.
 - Verify the Panel's Power ON/OFF switch is in "ON" position.
 - Verify that the Panel's Contrast control is not in "maximum" or "minimum" level position.
 - Verify the personal computer's CGA (or RGB) output is compatible with the QA-25 specifications. (See specifications on pages 24-28.)
-
- Change the position of the Panel's BACKGROUND switch. (Note: with some computers and software, in order to display "normal" images, it may be necessary to have this switch in "reverse" position.)
-
- The display may require an adjustment to make it compatible with your computer or software. Please refer to pages 12-19 "Projection Image Adjustments".
 - Verify the personal computer's CGA (or RGB) output is compatible with the QA-25 specifications. (See specifications on pages 24-28.)
-
- Adjust the display's CONTRAST control (see note on page 10 for explanation of how to achieve the best contrast position).
 - Make sure the overhead projector is properly adjusted.
 - Make sure the overhead projector is a good quality transmissive type, and that the heat from the projector does not cause the temperature of the LCD to reach 45°C.

Problems:

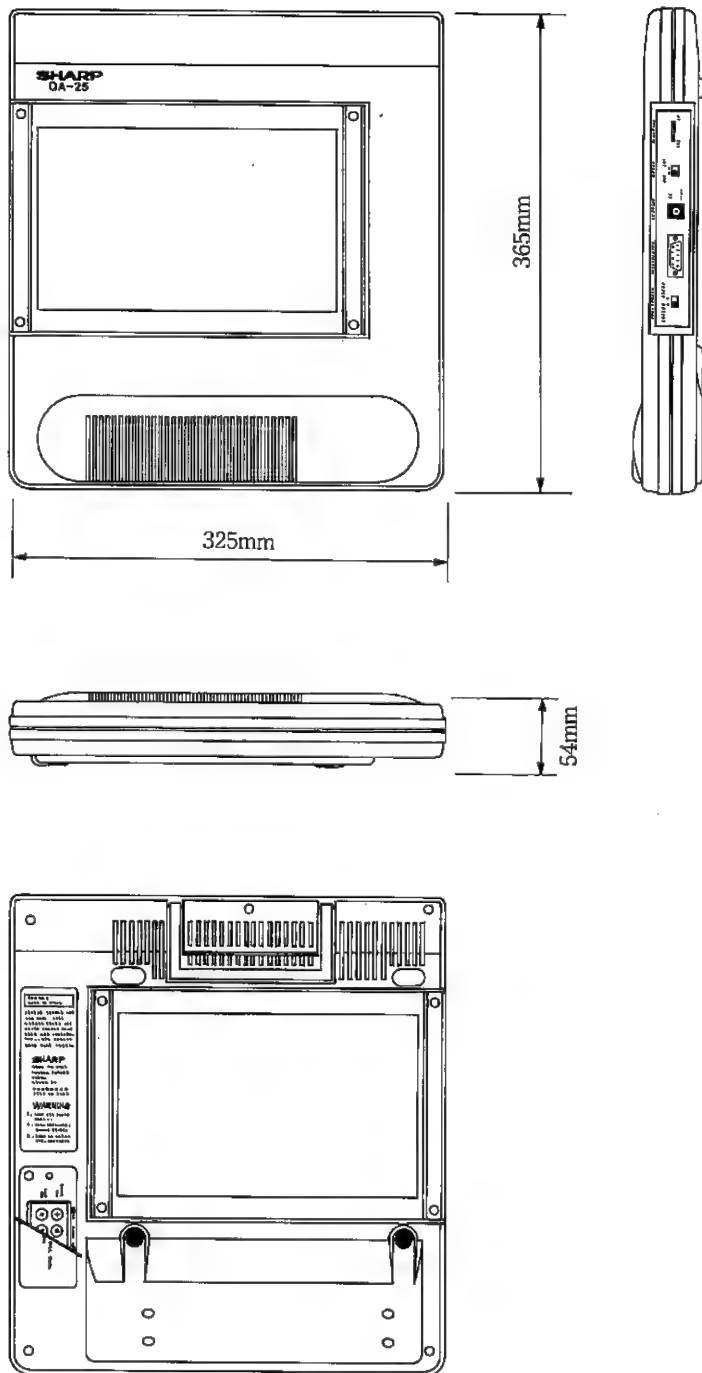
5. Projected images appear out of focus.

Possible Solutions:

- Make sure the overhead projector is a good quality **transmissive** type (and not a compact reflective mirror type).
- Make sure the overhead projector is in focus.
- Make sure the Panel is centered on the top of the overhead projector.
- The display may require an adjustment to make it compatible with your computer or software. Please refer to pages 12-19, "Projection Image Adjustments".
- Verify the personal computer's CGA (or RGB) output is compatible with the QA-25 specifications. (See specifications on page 24-28.)

9. SPECIFICATIONS

(a) EXTERNAL DIMENSIONS



(b) MECHANICAL SPECIFICATIONS

1) Panel

Dimension: 325 (W) × 365 (D) × 54 (H) mm
Net Weight: 2.7kg (6 lbs.)

2) LCD

LCD Type: Super Twisted High Contrast Monochrome LCD
Display Area: 208 (W) × 130 (H) mm
Display Format: 80 characters × 25 lines
640 (W) × 200 (H) pixels
Duty: 1/100
Dot Size: 0.285 (W) × 0.61 (H) mm
Dot Spacing: 0.04 mm (both widthwise and lengthwise)
Aspect Ratio: 2:1

(c) ENVIRONMENTAL CONDITIONS

Operating Temperature: 0~+30°C
Storage Temperature: -25~+60°C
Operating Humidity: 20~80%
Storage Humidity: 20~90% (no condensation)

NOTE

This Panel cannot be used with any overhead projector which causes the temperature of the LCD to reach 45°C or more under normal conditions.

(d) CONTROLS AND CONNECTORS

- 1) Located on the side of the Panel
 - BACKGROUND (NORMAL/REVERSE) Switch
 - CONTRAST Control
 - RGB SIGNAL INPUT Terminal (9-Pin D-SUB)
 - DC INPUT (5.5 mm dia. Concentric Plug)
 - POWER (ON/OFF) Switch
- 2) Located on the bottom of the Panel under protective door
 - Vertical Position (V-POS) (COARSE/FINE ADJ)
 - Horizontal Position (H-POS) (COARSE/FINE ADJ)
 - Frequency (FREQ) (COARSE/FINE ADJ)
 - Phase (PHASE)
 - RGB INPUT SELECT (ON/OFF) Switches

(e) ELECTRICAL SPECIFICATIONS

- 1) Compatible Computers
 - IBM PC/XT/AT computers and 100% compatibles when equipped with a Color Graphics Adaptor or Enhanced Graphics Adaptor (in CGA mode only).
 - Also compatible with other personal computers when the computer is equipped with an RGB adaptor whose output conforms with Sharp's published specifications.
- 2) Input Signal
 - RGB separate video signal (640 × 200 dots)
- 3) Input Signal Level and Polarity
 - RGB signal: TTL level Positive
 - Horizontal sync signal: TTL level Positive
 - Vertical sync signal: TTL level Positive

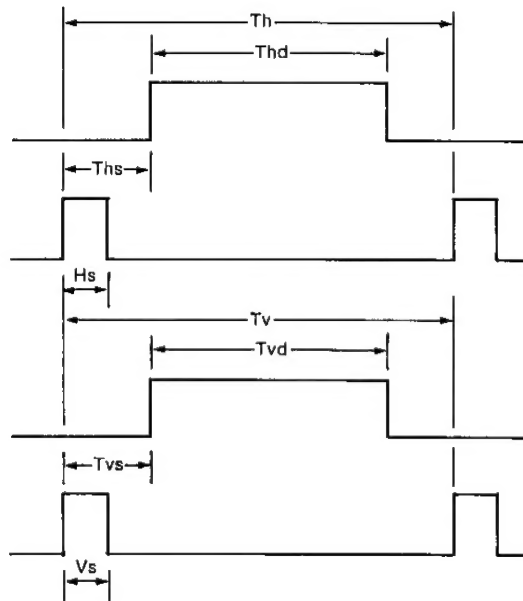
4) Input Signal Timing

RGB signal

Horizontal sync signal

RGB signal

Vertical sync signal



Timing ratings

Notes: $T_{ck} = 1/f_{ck}$ (IBM-PC CGA: $f_{ck} = 14.318$ MHz)

$T_{hd} = T_{ck} \times 640$, $T_{vd} = T_h \times 200$

Parameter	Symbol	Min.	Max.	Units
Horizontal period	T_h	60	65	μs
Horizontal sync signal pulse width	H_s	$3T_{ck}$	$T_h - 3T_{ck}$	—
Horizontal display start waiting time	T_{hs}	$5T_{ck}$	$256T_{ck}$	—
Vertical period	T_v	16.2	20	ms
Vertical display time	T_{vd}	12	13	ms
Vertical sync signal pulse width	V_s	$3T_h$	$T_v - 3T_h$	—
Vertical display start waiting time	T_{vs}	$4T_h$	$T_v - T_{vd}$	—

5) Power Supply

Panel: 9Volt, 300mA DC

AC Adaptor (ADP-0031): 220 Volt $\pm 10\%$, 50Hz, 10W AC

6) Power Consumption

Approx. 5W (measured under standard experimental conditions)

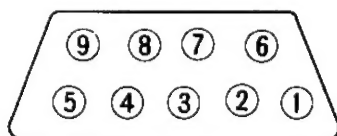
(f) INPUT TERMINALS

1) RGB SIGNAL INPUT connector (at the side of the Panel).

The RGB separate video signal from a personal computer is input using the Signal Cable.

■ Pin assignment

- ① GND
- ② GND
- ③ R signal
- ④ G signal
- ⑤ B signal
- ⑥ NC
- ⑦ NC
- ⑧ Horizontal sync signal
- ⑨ Vertical sync signal



■ Connector

9-pin D-SUB

2) DC INPUT connector

Connect the AC Adaptor plug to this connector.

5.5mm diameter concentric plug

Inside: Positive

Outside: GND

(g) INCLUDED ACCESSORIES

(1) RGB Signal Cable (Approx. 2 m) (Sharp Part No. DSOCZ0055PAZZ)

(2) ADP-0031 AC Adaptor (Cord length: approx. 2 m) (Sharp Part No. DADP-0031PAZZ)

(3) Operation Manual (Sharp Part No. TINSL0003PAZZ)

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